Holophœa cærulea, sp. n.

Female.—Primaries and secondaries uniformly dark bluish black. The head, antennæ, thorax, and legs black; abdomen dark glossy blue-black; the collar and the edges of the tegulæ bright red.

Expanse $1\frac{1}{4}$ inch.

Hab. Ecuador (*in the Hope Collection, Mus. Oxford*).

Atyphopsis roseiceps, sp. n.

Male.—Primaries and secondaries semihyaline greyish white, the veins all dark brown, the apex dark brown. The head, antennæ, collar, tegulæ, thorax, abdomen, and legs pale greyish brown; the top of the head and the fourth and fifth segments of the abdomen pale red; the anus black.

Expanse $1\frac{1}{4}$ inch.

Hab. S.E. Brazil, Rio Janeiro (*in the Hope Collection, Mus. Oxford*).

The specimen is in very poor condition and much faded.

LXIII.—*On the Place of the Sponges in the Classificatory System and on the Significance attributed to the Embryonic Layers.* By Edmond Perrier*.

In a note published in the last number of the 'Comptes Rendus' M. Yves Delage proposes "to raise the Spongiariæ to the rank of a branch by contrasting them, under the name Enantioderma (ἐναντίος, contrary), with the Cœlenterata, if not, indeed, under the title Enantiozoa, with all other animals, Protozoa, Mesozoa, and Metazoa, in which the invagination of the layers, when they exist, takes place in the normal way." Since as early as 1881, in the first edition of my book 'Les Colonies animales et la Formation des Organismes' (p. 764), I laid claim to a distinct series in the animal kingdom on behalf of the Sponges, and as, since then, I have not ceased to defend this manner of regarding them†, I cannot but congratulate myself on seeing, after the lapse of sixteen years, my opinion embraced by the industrious professor of the Sorbonne. Since the Sponges were already called by this name, and were also termed Spongiariæ, Spongozoa, Porifera, Polystomata, &c., I did not, indeed, consider it advisable to add a new number to this already copious list.

* Translated by E. E. Austen from the 'Comptes Rendus,' t. cxxvi. no. 8 (February 21, 1898), pp. 579-583.

† *Cf.* my 'Traité de Zoologie,' pp. 407 and 537. Huxley, in 1874, in his embryogenic classification, already separated the Sponges from the Cœlenterata under the name Polystomata; Milne-Edwards, in 1855, and de Blainville, in 1822, had treated them in the same way. But the former associated them with the Infusoria, the latter with the Infusoria and the Corallina.

The characters upon which I had relied for establishing the Sponges as a distinct series—*ramified or irregular shape, absence of general cavity, great development of mesoderm, ciliated chambers lined with choanocytes, absence of nematocysts and of tentacles*—were known already; but having taken care to define strictly the starting-points of the nomenclature that I adopted, and to explain clearly what I meant by the terms *series, branch, class,* &c.*, they were amply sufficient to establish a due conception of Sponges. The apparently new character invoked by M. Delage would therefore only serve to justify the importance of those upon which I had dwelt, even though it should be found not to be open to criticism and were freed from the, at the very least, debatable interpretations with which it has been surrounded.

For anyone who reflects that the organization of animals is dominated by general rules, it is difficult to admit that a zoological group can be *opposed* to another, and especially to the remaining groups as a whole; in truth the idea would appear to be but a metaphor to be added to those with which the language of zoology is already obscured, if the author did not take care to tell us that "*in the Spongiariæ,* **alone among all creatures,** *the normal invagination of the layers is reversed, the endoderm passing to the surface to form the epidermis, and the ectoderm sinking into the interior to form the digestive cavities.*" Of the causes which could have produced so extraordinary a reversal M. Delage tells us nothing, and yet zoology is to-day too rich in materials for it to be still possible to suppose, if we take our stand on the ground of transmutation, that reversals of layers and transformations of organs occur which could not be connected with causes that are at least probable.

But in order to arrive at the conclusion that the Sponges are the reverse of the rest of the animal kingdom, M. Delage has recourse to processes of argument and to generalizations the value of which it is important to determine.

If we were ignorant, he remarks, of the development of Sponges, and the larvæ of these animals were presented to embryogenists with the request that they should name the layers and predict their development, *there is not one of them* who would not say that the flagellate cells are the ectoderm, that the granular cells are the endoderm, and that the invagination of the latter within the former will ensue. There is therefore no doubt as to the homologization of the larval layers.

The definition of the *homologies* is due to Geoffroy Saint-

* 'Colonies animales,' p. 744, and 'Traité de Zoologie,' p. 403.

Hilaire, who termed them *analogies* ; it is based on the *principle of connexions*—that is to say, that it rests on the relative position of the organs in the adult state and on the identity of their mode of succession during the embryonic period, to the exclusion of all consideration of function or of structure. The endoderm being essentially that which is within, the ectoderm that which is without, as indicated by their names, it is clear that there is neither endoderm nor ectoderm in a hollow body, such as the most simple form of sponge-larva, formed of a single layer of cells, and that, in order to remain in conformity with the precise language of comparative anatomy and embryogeny, it will be necessary, if one half of this body is invaginated within the other, to apply the designation *entoderm* to that which becomes internal and to term *exoderm* that which remains external. The proposition of M. Delage might therefore be enunciated simply as follows :—

The larva of Sponges is an ellipsoid, one cap of which is formed by flagelliferous, the other by granular cells ; the cap of flagelliferous cells is invaginated into the other and constitutes the entoderm.

In designating this cap by the name *exoderm*, in homologizing it with the exoderm of the rest of animals, we run counter to the very definition of homologies, for it is implicitly agreed that the character of the exoderm is derived not from its position, but from the form of the anatomical elements composing it.

The character invoked by M. Delage amounts therefore to saying that the entoderm of Sponges is formed of flagelliferous and their exoderm of granular elements ; it is a *histological character*, like that which is derived from the presence of the choanocytes in the ciliated chambers—nay, more, *it is exactly the same character*, since M. Delage recognizes that the ciliated chambers originate from his supposed exoderm, and the question of the position of the Sponges remains precisely at the point at which it had been left by his predecessors. The apparent progress results simply from the credence once more accorded to the metaphysical theory of the embryonic layers and of their predestination—a theory in some sort *retroactive*, like all those which claim to apply to the lower animals conceptions derived from the study of the higher animals, often even of single vertebrates, and based upon structural features which are the result of the activity of primitive animal forms, or are considered as such, but are not yet realized in them. Every animal, it is said, is at first a *gastrula*, composed of an exoderm and an entoderm : the generalization is gratuitous ; the exoderm and entoderm are

recognized by this or that histological structure : it is a proposition contrary to the very definition of homologies ; they are predestined to play such and such a *rôle* in development : this is metaphysics.

The circumstances appear under a totally different aspect, and no longer lend themselves to any obscurity, if, following the facts without attributing to them any mysterious significance, we remember that the primitive form of every embryo * is not a *gastrula* composed of two layers, as is gratuitously supposed, but a *blastula* more or less approaching the ellipsoidal shape, and constituted by a single layer of cells. This larva is ciliated, and the strokes of the cilia impel it in a fixed direction ; it therefore possesses an anterior and a posterior pole. From the moment at which locomotion is accomplished in a definite direction the cilia of the anterior region of the *blastula* are necessarily those which exhibit the maximum of activity ; their activity exhausts the alimentary reserves of the elements which bear them, while the elements of the posterior region remain crammed with these reserves. The elements which are disburdened of these reserves are always those the multiplication of which is the most active.

This being granted, the *blastula* can follow only two courses in its evolution—either it remains free or else it becomes fixed. If it remains free its *locomotor* anterior region, by reason of its rapid growth, necessarily induces the invagination of the posterior region, which is essentially *nutritive*, and this is why the orifice of invagination, which has for so long been erroneously considered as a primitive mouth, is very generally posterior in the Nephridiate series (" dans la série des Néphridiés "). If, on the contrary, the *blastula* becomes fixed, it does so necessarily (the exceptions to the rule in the animal kingdom are only apparent) by its anterior locomotor region. Indeed, an animal cannot adhere to an obstacle except by pressing against it—that is to say, by applying against it the region which, in its habitual mode of locomotion, it carries in front. It is therefore the ciliated region of the *blastula* that in this case will be covered by the granular region, will proliferate, multiplying its anfractuosities on the inside of its envelope, and will constitute the entoderm : thus is to be explained the particular case of the Sponges, which henceforth there is no need to *contrast* with the rest of the animal kingdom ; they detach themselves from the common branch because they become fixed in the *blastula* state ; in respect to this they diverge from the Polyps, since in the latter the cavity of the *blastula*, already filled with elements,

* Except in the Arthropod series, where the vibratile cilia are absent.

has become a *parenchymella* at the moment of fixation; here, therefore, no invagination takes place. This, of course, applies in each series only to the primitive larval forms, and not to those which have been modified by tachygenesis. M. Delage's remark, therefore, does not throw any particular light on the problem of the place of the Sponges in classification, and the terms that he employs to designate a group of the animal kingdom already named by the Greeks might lead to error with reference to the signification of what it has been agreed to call the *embryonic layers*.

It remains to be learnt whether the histological characters have as little value as is apparently sometimes believed. Remembering that the entire vegetable kingdom owes its essential characters to the fact that the elements of the plant shut themselves up in an envelope of cellulose, that the faculty of charging themselves with chitin possessed by the free region of the epithelia of Arthropods has suppressed in these animals the vibratile cilia, orientated their organization in an altogether peculiar direction, and justified the creation of a branch for them—it will not appear to be immaterial that the Sponges and the Polyps possess respectively, and each in an exclusive manner as regards the other group, choanocytes or nematoblasts. This is also a consequence of the properties in their protoplasm.

PROCEEDINGS OF LEARNED SOCIETIES.

GEOLOGICAL SOCIETY.

November 17th, 1897.—Dr. Henry Hicks, F.R.S., President, in the Chair.

The following communication was read:—

'Observations on the Genus *Aclisina*, de Koninck, with Descriptions of British Species, and of some other Carboniferous Gastropoda.' By Miss J. Donald, of Carlisle.

The Author makes some preliminary observations on the genus *Aclisina*, and considers it advisable to regard *A. pulchra* as the type of the genus, while the so-called *A. striatula* must be placed among the *Murchisoniæ*, and *A. nana* is placed in a new genus. The Author gives a diagnosis of *Aclisina*, de Kon., belonging to the family Turritellidæ, and describes the British species, twelve of which are new, including two new forms placed in a subgenus.

Of the family Murchisonidæ, and in the section *Aclisoides* of the genus *Murchisonia*, the form *A. striatula*, de Kon., and a variety are described; and a diagnosis of the new genus, in which *A. nana* of de Koninck is placed, is given, followed by a description of the species.